

**H0001788**

## CLAIMS

**What is claimed is:**

- [c1] 1. An apparatus for directing laser energy to a plurality of targets in multiple fields of view, and receiving the scattered returns therefrom, comprising:
- a plurality of condensing optical elements for collecting said scattered returns,
  - a plurality of windows for allowing said laser energy to pass therethrough;
  - an optical enclosure being formed from a combination of said condensing optical elements and said windows;
  - a multiple-axis scanning mirror positioned to receive a laser beam, said multiple-axis scanning mirror directing said laser beam into one or more predetermined scan patterns; and
  - a fold mirror with patterned aperture positioned to intercept the laser scan pattern, from said scanning mirror, said fold mirror directing a first portion of said laser scan pattern along a first field of view and a second portion of said laser scan pattern along a second field of view.
- [c2] 2. The apparatus in accordance with claim 1 wherein said multiple-axis scanning mirror is located within said optical enclosure and receives said laser beam through an aperture in said optical enclosure.
- [c3] 3. The apparatus in accordance with claim 1 wherein said fold mirror further comprises:
- a transmissive central region passing said first portion of said laser scan pattern therethrough; and
  - a periphery deflecting said second portion of said laser scan pattern in a direction along said second field of view.

**H0001788**

- 1   **[c4]**    4.    The apparatus in accordance with claim 1 further comprising a plurality of  
2           detectors, each detector converting said scattered returns collected from a  
3           respective condensing optical element into electrical signals.
- 1   **[c5]**    5.    The apparatus of claim 1 wherein said condensing optical element is selected  
2           from the group consisting of imaging optical elements, non-imaging optical  
3           elements, reflective optical elements, refractive optical elements, diffractive optical  
4           elements, and holographic optical elements.
- 1   **[c6]**    6.    The apparatus of claim 1 wherein said periphery includes a light directing  
          element selected from the group consisting of reflective elements, refractive  
          elements, diffractive elements, and holographic elements.
- 1   **[c7]**    7.    The apparatus of claim 1 wherein said transmissive central region is selected  
          from the group consisting of a physical hole, a holographic element, a partially-  
          transparent refractive element, and a substantially-transparent refractive element.
- 1   **[c8]**    8.    The apparatus of claim 1 wherein said fold mirror is tilted at a predetermined  
          angle with respect to the laser energy from said scanning mirror.
- 1   **[c9]**    9.    The apparatus of claim 8 wherein said fold mirror with patterned aperture  
2           comprises a plurality of holographic optical elements.
- 1   **[c10]**   10.   The apparatus of claim 8 wherein said fold mirror with patterned aperture  
          comprises one or more electrically switchable holographic optical elements.
- 1   **[c11]**   11.   A laser scanner for directing laser energy to a plurality of targets in multiple  
2           fields of view, and receiving the scattered returns therefrom, comprising:  
3           a plurality of condensing optical elements for collecting said scattered returns,  
4           a plurality of windows for allowing said laser energy to pass therethrough;

5 an optical enclosure being formed from a combination of said condensing  
6 optical elements and said windows;

7 a multiple-axis scanning mirror located external to said optical enclosure  
8 and positioned to receive a laser beam, said multiple-axis scanning mirror  
9 directing said laser beam through an aperture into said optical enclosure and  
10 forming a laser scan pattern therefrom;

11 a fold mirror with patterned aperture located within said optical enclosure  
12 and positioned to intercept the laser scan pattern, said fold mirror comprising,

13 a transmissive central region passing a first portion of said laser scan  
14 pattern therethrough in a direction substantially along a first field of view,  
15 and

16 a periphery deflecting a second portion of said laser scan pattern in a  
17 direction along a second field of view; and

18 a plurality of detectors, each detector located proximal to said optical  
19 enclosure to convert said scattered returns collected from a respective  
20 condensing optical element into electrical signals.

1 [c12] 12. The laser scanner of claim 11 further comprising beam expansion optics.